

Summary

Fuqua Executive MBA students built a business value assessment calculator for the SAS Energy Analytics division to show their energy customers the economic benefits of more accurate power forecasting.

Project Snapshot

Focus: Value Assessment

Client: SAS Institute

Industry: Energy

Type: For-profit

HQ: Cary, NC, USA

Student Profile

Fuqua Executive MBA students are working professionals with an average of 11 years of industry experience. Executive MBA students often take FCCP to explore a career change.

Challenge

SAS Institute is a global business predictive analytics software and service company. Their energy division supports a platform for improving existing energy generation forecasts by leveraging existing power datasets and using advanced statistical analysis in order to assist utilities in providing safe, reliable, and affordable power generation for their customers. Accurate net load forecasting (NLF) helps predict energy demand, increases the reliability of the energy grid, and can reduce negative environmental impacts.

SAS approached the Fuqua Client Consulting Practicum to create a business value assessment calculator to prove the value of NLF at the distribution level to quantify the value of their services and products to prospects in the utilities market.

Approach

The FCCP student team, comprised of Executive MBA students with an average of 10+ years in industry, tackled this challenge by first gaining an understanding of the distribution-level power grid (e.g., substations, transformers) business models and the potential benefits of accurate NLF on financial and operational outcomes via interviews with potential customers and SAS experts.

Harnessing Duke Energy as a use case, students conducted hypothesis testing by building out a preliminary Excel model. Key calculator inputs included total traditional and renewable power generation, actual energy consumption, and electricity pricing data for retail customers. Other input data were sourced publicly.

These inputs were modeled and transformed to arrive at value outputs like profit or loss and the estimated value of forecast error. Following a sensitivity analysis, a path forward for future development and improvements were also identified for the next version of the calculator.

Results



The student team's development and implementation of the business value calculator enabled SAS to meet its objectives of adding value to its utility customers. The calculator is designed to help SAS customers reduce the possibility of significant forecasting errors that lead to supply-demand imbalances, costly last-minute adjustments in generation, impacts to energy trading, and grid stability.

In building this calculator, students employed historical and predictive data analysis, scenario analysis, Monte Carlo simulation, machine learning techniques, policy impact assessment, and expert interviews as approaches to evaluate the impact of various factors on forecast error.

Along with presenting their calculator at the end of the course, the Fuqua student team recommended other future considerations as well, such as developing hybrid forecasting models, exploring the application of AI techniques, adding beneficial supplementary modules to the calculator, and considerations for other potential output or input metrics (eg., safety and OSHA metrics).



The Fuqua Executive MBA student team represented a variety of backgrounds, such as business intelligence, consulting and IT delivery, engineering management, marketing strategy, and oil and gas data analytics. From top left: Toba Oyewunmi '24, Aparajita Pochiraju '24, Patricia Banks '24, Chris Scallion '24, Gaurav Dwivedi '24.

“The FCCP team's industry expertise, work ethic, and business insight significantly contributed to this project. Such partnerships are essential for leveraging sophisticated analytical tools for strategic decision-making, setting new standards for innovation and operational efficiency in the utility industry.”

Joe Nyangon, PhD, Senior Industry Consultant for Power and Utilities Innovation, SAS Energy & Utilities

About FCCP

The Fuqua Client Consulting Practicum is a for-credit experiential learning course at Duke University's Fuqua School of Business. In FCCP, students apply their business skills and relevant work experience to an active project engagement with an external client. Interested in engaging our students? Learn more at www.fccp.fuqua.duke.edu.